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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,469	09/22/2003	Vicente V. Cavanna	10030875-1	2941
57299	7590	12/05/2006	EXAMINER	
AVAGO TECHNOLOGIES, LTD. P.O. BOX 1920 DENVER, CO 80201-1920			TORRES, JOSEPH D	
			ART UNIT	PAPER NUMBER
			2133	

DATE MAILED: 12/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/668,469

Applicant(s)

CAVANNA ET AL.

Examiner

Joseph D. Torres

Art Unit

2133

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10/03/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 15-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,7,8,11-14,19 and 20 is/are rejected.
- 7) ☒ Claim(s) 3-6,9 and 10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 9/22/03, 2/8/05.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Group I (claims 1-14, 19 and 20) in the reply filed on 10/03/2006 is acknowledged.

Claims 1-14, 19 and 20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10/03/2006.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 7, 8, 11-14 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Dravida; Subrahmanyam (US 5282214 A).

35 U.S.C. 102(b) rejection of claims 1 and 19.

Dravida teaches generating a first remainder based on the sub-message data and a first factor of the CRC generating polynomial ( $r_i(x)$  in Equation 20 in col. 5 of Dravida for some  $i < k-1$  is a first remainder calculated from sub-message data  $A_{k-1-i}$  of message  $M(x)$  in Equation 14 in col. 4 of Dravida using first factor  $f(x)$  of the CRC generating

Art Unit: 2133

polynomial  $G(x)$  in Equation 4 of col. 3 in Dravida); generating a second remainder based on the sub-message data and a second factor of the CRC generating polynomial ( $t_i(x)$  for some  $i < k-1$  in Equation 30 in col. 6 of Dravida is a second remainder based on the sub-message data and a second factor  $1+x$  of the CRC generating polynomial  $G(x)$  in Equation 4 of col. 3 in Dravida; Note: Equation 21 teaches that  $C_i(x)$  is calculated based on sub-message data  $A_{k-1-i}$  and since  $t_i(x)$  is calculated based on  $C_i(x)$ ,  $A_{k-1-i}$  is also the basis for calculating  $t_i(x)$ ); and generating the CRC for the composite sub-message based on adjusted versions of the first and the second remainders (Equation 12 in col. 4 of Dravida teaches generating the CRC  $R(x)$  for the composite sub-message based on adjusted versions of the first and the second remainders,  $R'(x)$  and  $R''(x)$ ; Note: col. 6, lines 37-39 in Dravida teach that  $R'(x)$  is an adjusted version of first remainder  $r_i(x)$  for some  $i < k-1$  corresponding to the final  $r_{k-1}(x)$  in Equation 26 in col. 5 of Dravida and  $R''(x)$  is an adjusted version of first remainder  $t_i(x)$  for some  $i < k-1$  corresponding to the final  $t_{k-1}(x)$  in Equation 26 in col. 5).

35 U.S.C. 102(b) rejection of claims 7 and 8.

Equations 20, 26, 30 and 33 in columns 5 and 6 of Dravida.

35 U.S.C. 102(b) rejection of claim 11.

See Figure 5 in Dravida where generating the CRC,  $R(x)$ , comprises mapping the adjusted versions of the first and the second remainders,  $R'(x)$  and  $R''(x)$ , to a corresponding CRC,  $R(x)$ .

35 U.S.C. 102(b) rejection of claim 12.

See Combinational Logic block 104 in Figure 1 and 5 of Dravida using combinational logic to map the first and the second remainders,  $R'(x)$  and  $R''(x)$ , to a corresponding CRC,  $R(x)$ .

35 U.S.C. 102(b) rejection of claims 13 and 14.

Col. 2, line 47-68 in Dravida. Note: a primitive polynomial is inherently irreducible.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 2 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dravida; Subrahmanyam (US 5282214 A) in view of Wong; Wing Tak Kenneth (US 6044482 A).

35 U.S.C. 103(a) rejection of claims 2 and 20.

Dravida substantially teaches the claimed invention described in claim 1 (as rejected above).

However Dravida does not explicitly teach the specific use of adjusting at least one of the first and the second remainders based on the number,  $n-k$ , of trailing zeros in the composite sub-message.

Wong, in an analogous art, teaches that a message  $M(x) = D(x)$  in col. 3, lines 51-67 of Wong includes  $n-k$  trailing zeroes required to generate an  $n$ -bit codeword from a  $k$ -bit message where  $n > k$ . Since  $r_i(x)$  in Dravida is adjusted to produce  $R'(x)$  for all message bits in  $M(x) = D(x)$  it is also adjusted based on the number,  $n-k$ , of trailing zeros in the composite sub-message

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dravida with the teachings of Wong by including use of adjusting at least one of the first and the second remainders based on the number,  $n-k$ , of trailing zeros in the composite sub-message. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of adjusting at least one of the first and the second remainders based on the number,  $n-k$ , of trailing zeros in the

composite sub-message would have provided  $n-k$  trailing zeroes required to generate an  $n$ -bit codeword from a  $k$ -bit message where  $n > k$ .

***Allowable Subject Matter***

4. Claims 3 and 4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 5 and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 9 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an Examiner's statement of reasons for the indication of allowable subject matter:

The present invention pertains to a method for generating CRC for a message by factoring the generator polynomial and using the factors to generate intermediate CRC components from sub-message components, which are combined at a later time to form the CRC for the message.

Art Unit: 2133

The Prior Art of record, and in particular, Dravida (US 5282214 A) teaches generating a first remainder based on the sub-message data and a first factor of the CRC generating polynomial ( $r_i(x)$  in Equation 20 in col. 5 of Dravida for some  $i < k-1$  is a first remainder calculated from sub-message data  $A_{k-1-i}$  of message  $M(x)$  in Equation 14 in col. 4 of Dravida using first factor  $f(x)$  of the CRC generating polynomial  $G(x)$  in Equation 4 of col. 3 in Dravida); generating a second remainder based on the sub-message data and a second factor of the CRC generating polynomial ( $t_i(x)$  for some  $i < k-1$  in Equation 30 in col. 6 of Dravida is a second remainder based on the sub-message data and a second factor  $1+x$  of the CRC generating polynomial  $G(x)$  in Equation 4 of col. 3 in Dravida; Note: Equation 21 teaches that  $C_i(x)$  is calculated based on sub-message data  $A_{k-1-i}$  and since  $t_i(x)$  is calculated based on  $C_i(x)$ ,  $A_{k-1-i}$  is also the basis for calculating  $t_i(x)$ ); and generating the CRC for the composite sub-message based on adjusted versions of the first and the second remainders (Equation 12 in col. 4 of Dravida teaches generating the CRC  $R(x)$  for the composite sub-message based on adjusted versions of the first and the second remainders,  $R'(x)$  and  $R''(x)$ ; Note: col. 6, lines 37-39 in Dravida teach that  $R'(x)$  is an adjusted version of first remainder  $r_i(x)$  for some  $i < k-1$  corresponding to the final  $r_{k-1}(x)$  in Equation 26 in col. 5 of Dravida and  $R''(x)$  is an adjusted version of first remainder  $t_i(x)$  for some  $i < k-1$  corresponding to the final  $t_{k-1}(x)$  in Equation 26 in col. 5). The prior art however are not concerned with and do not teach, suggest, or otherwise render obvious "wherein the first remainder is an  $m$ -bit remainder, and wherein the adjusting step comprises: storing the first remainder in an  $m$ -bit memory location; examining each bit of  $N$ , where  $N$  equals  $n \bmod (2^{m-1})$ ; and selectively advancing the



Art Unit: 2133

contents of the m-bit memory location to a next state based on a value of each bit of N, the next state determined by a Galois field defined by the first factor" as taught by claim 3 and its base and intervening claims. Hence the prior art taken alone or in any combination fail to teach the claimed novel feature in claim 3 in view of its base and intervening claims.

Claim 4 depends from claim 3; hence has allowable subject matter for the same reasons as claim 3.

In addition, the prior art are not concerned with and do not teach, suggest, or otherwise render obvious "wherein the first remainder is an m-bit remainder, and wherein the adjusting step comprises: storing the first remainder in an m-bit memory location; and examining each bit of N, where N equals  $n \bmod (2^{m-1})$ , in order from a most significant bit to a least significant bit; the examining act for each examined bit comprising: finite field squaring the contents of the m-bit memory location, and; if the examined bit equals one, advancing the contents of the m-bit memory location to a next state as determined by a Galois field defined by the first factor" as taught by claim 5 and its base and intervening claims. Hence the prior art taken alone or in any combination fail to teach the claimed novel feature in claim 5 in view of its base and intervening claims.

Claim 6 depends from claim 5; hence has allowable subject matter for the same reasons as claim 5.

Art Unit: 2133

In addition, the prior art are not concerned with and do not teach, suggest, or otherwise render obvious “wherein the step of generating a first remainder comprises: dividing the sub-message data by the CRC generating polynomial, thereby generating an unadjusted composite remainder; and dividing the unadjusted composite remainder by the first factor, thereby generating the first remainder” as taught by claim 9 and its base and intervening claims. Hence the prior art taken alone or in any combination fail to teach the claimed novel feature in claim 9 in view of its base and intervening claims. Claim 10 depends from claim 9; hence ha allowable subject matter for the same reasons as claim 9.

### ***Conclusion***

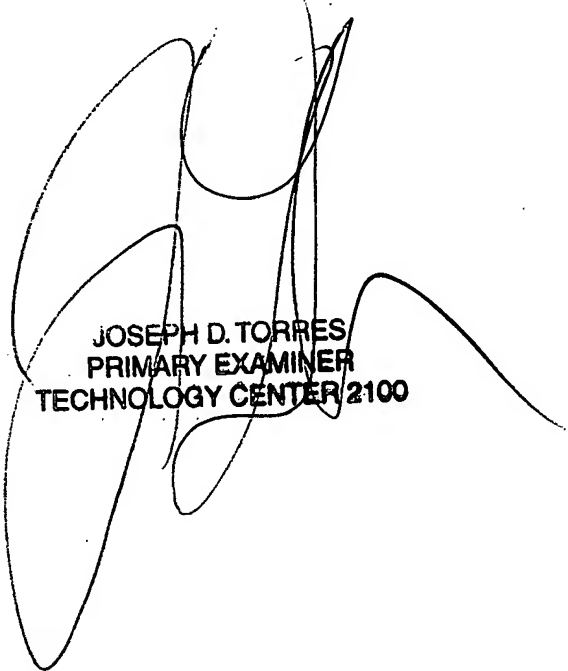
5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (571) 272-3829. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2133

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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